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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/509,038	09/27/2004	Lutz Finn	1454.1568	1541

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EXAMINER	
CHAUDRY, MUJTABA M	

ART UNIT	PAPER NUMBER
2133	

DATE MAILED: 01/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/509,038	FINN ET AL.	
	Examiner	Art Unit	
	Mujtaba K. Chaudry	2133	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 September 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *6-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *6-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 September 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *9/27/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Preliminary Amendment

The preliminary amendment filed September 27, 2004 has been received and entered. Claims 6-16 are currently pending in the present application and are examined on the merits.

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

The information disclosure statement (IDS) submitted on September 27, 2004 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement has been considered by the Examiner.

Oath/Declaration

The Oath filed September 27, 2004 complies with all the requirements set forth in MPEP 602 and therefore is accepted.

Drawings

The drawings are objected to because:

- Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.
- Figure 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Appropriate correction is required.

Specification

The specification filed September 27, 2004 in the preliminary amendment is accepted.

Claim Objections

Claim 6 is objected to because of the following informalities:

- In lines 3-4 the phrase, "...first metrics values..." should perhaps be "...first metric values..."

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 6-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- The term "precisely" in the claims is a relative term and should be avoided. It is understood that when something is calculated mathematically, it is usually precise unless otherwise stated.
- The terms "i" and "n" are not defined, in claim 6 for example. However, if "n" is defined then "i" depends on "n" and would be then defined.
- It is not clear what is meant by "i-1-th" in the claims.
- The terms "K" and delta is not defined, for example claim 7.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 6-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nieminen et al. (USPN 2002/0012408A1) further in view of Sadjadpour (USPN 6226773B1).

As per claim 6, Nieminen et al. (herein after referred to as: Nieminen) substantially teaches (abstract) an arrangement for and a method of decoding a convolutionally encoded codeword by means of a window sliding over the codeword. Path metrics are computed simultaneously forwards and backwards in the sliding window. A decoding result is computed in a synthesis unit on the basis of the path metrics. The sliding window is divided into four parts. Path metrics are computed in the forward direction in the first part of the sliding window and stored in a four-part memory. Path metrics are computed in the backward direction in two other parts of the sliding window in such a way that the input of the computation units comes from the four-part memory; the computed metrics are applied to the synthesis unit; and a decoding result is computed.

Nieminen does not explicitly teach to calculate an ith operation wherein i is greater than 1 and less than or equal to n as stated in the present application.

However, Sadjadpour substantially teaches, in an analogous art, (col. 2, lines 20-68) to minimize the memory requirements to compute MAP-based decoding algorithms. The architecture used to implement the minimization the memory requirement for alpha and beta by a factor of 2. Since N, the Turbo block length, is usually a large number in Turbo codes, the architecture provides a significant reduction in hardware requirements. In particular, Sadjadpour teaches (col. 3, lines 65-68—col. 4, lines 1-65) to calculate an i^{th} operation wherein i is greater than 1 and less than or equal to n. Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate calculating an ith operation wherein i is greater than 1 and less than or equal to n within the teachings of Nieminen. This modification would have been obvious to one of ordinary skill because one of ordinary skill in art would have recognized that by calculating an ith operation wherein i is greater than 1 and less than or equal to n within the decoding process of Nieminen would have minimized memory requirements.

As per claims 7-8 and 14-15, Nieminen substantially teaches, in view of above rejections, (Figure 4) a sliding window 400, the length of which is in this example 128. The sliding window is divided into four parts 402 to 408, the length of each part being 32. In the first part 402 of the sliding window, computation is performed in the forward-direction, i.e. from left to right. The data is read from the first memory, and the resulting data is stored in one of the parts M0 to M4 of the second memory. In the second window 404, the computation unit performs the learning period, reading data from one of the parts M0 to M4 of the second memory. This computation proceeds from right to left. There are no activities in the third part 406 of the window, whereas in the fourth part, actual computation is performed reading data from one of the parts M0 to M4

of the second memory. This computation also proceeds from right to left. This uses different parts of the memory.

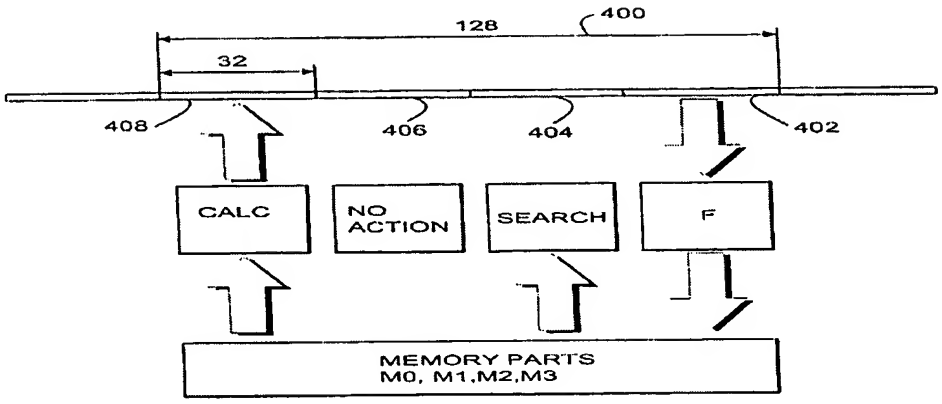

Fig. 4

As per claims 9 and 12, Nieminen substantially teaches, in view of above rejections, (Figure 3) the signal 300 to be decoded is applied to a first memory element, i.e. an input buffer 302. The signal comprises a systematic part S and parity parts P1 and P2, as described earlier. In the forward-direction, a unit 304 computing path metrics reads data from the buffer memory. The unit stores data in a second memory element 306. The memory element 306 has four parts. The decoder comprises two other computation units 308, 310 performing backward-computation of path metrics. The inputs of these computation units are connected to the second memory element 306, from where they read the data the unit 304 has processed. The outputs of the computation units 308, 310 are connected to a multiplexer 312. The decoder further comprises a synthesis unit 314, which computes on the basis of the path metrics a soft decision, a hard decision and a new extrinsic weight coefficient for the next iteration round. The input of the synthesis unit is formed by the outputs from the second memory element and the multiplexer. The decoder also comprises control logic 316, which controls the operation of the

different parts, such as the use of the second memory element 306, and the multiplexer in such a way that the outputs of the computation units 308, 310 are applied to the synthesis unit in turn.

As per claims 10-11, 13 and 16, Sadjadpour substantially teaches, in view of above rejections, (col. 2, lines 20-35) to implement the decoding process by software, firmware, or hardware; for example, hardware that may be utilized to implement in an integrated circuit, a microprocessor, or an ASIC (application-specific integrated circuit) such as a VLSI chip that is presently being built by MITEL corporation.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Additional pertinent prior arts are included herein for Applicant's review.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mujtaba K. Chaudry whose telephone number is 571-272-3817. The examiner can normally be reached on Mon-Thur 9-7:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert DeCady can be reached on 571-272-3819. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Mujtaba Chaudry
Art Unit 2133
January 4, 2006

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